

# A High-Efficiency Compact SiC-based Power Converter System, Phase II

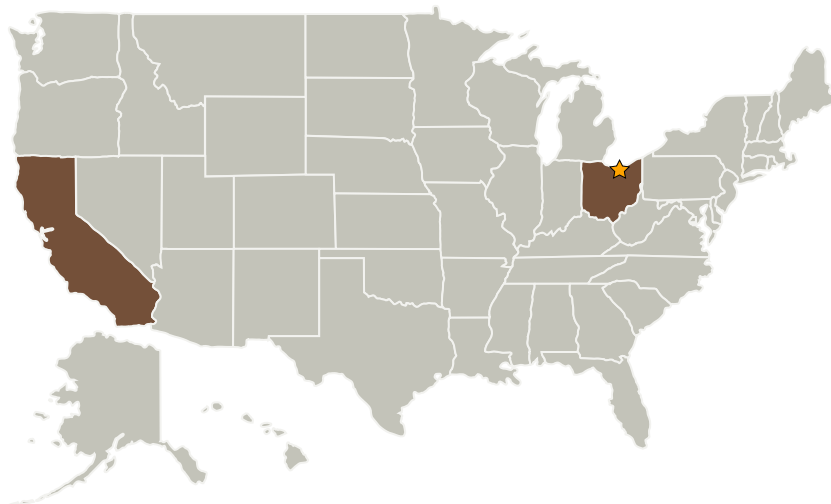
Completed Technology Project (2007 - 2009)



## Project Introduction

Wide-bandgap SiC semiconductors have been recently investigated for use in power devices, because of their potential capabilities of operating at high power densities, high temperatures and at high frequencies and thus offering advantages such as high efficiency, small size and light weight. Currently a few power devices based on SiC technology have been demonstrated and commercialized. Therefore, an opportunity exists to develop and demonstrate a SiC power inverter, showing the system-level impacts of using commercially available SiC power devices compared with an Si-based inverter, and addressing the related technical issues/risks of implementing SiC technology. Following a successful demonstration of the concept feasibility in Phase I, Phase II research will fully develop, demonstrate, model, and characterize a three-phase all SiC inverter. The inverter will be constructed through the integration of several supporting technologies including circuit design and device paralleling, high temperature packaging and thermal management, high temperature gate based on SOI technology, and other passive components. In the Phase II, the underlying technical issues that govern the fabrication and performance of this SiC inverter will be addressed, and its technical/economical benefits will be analyzed. By implementing technology developed, a high-efficiency, compact SiC inverter technology can be anticipated for potential NASA and other applications.

## Primary U.S. Work Locations and Key Partners



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## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Center / Facility:

Glenn Research Center (GRC)

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Aegis Technology, Inc.	Supporting Organization	Industry Women-Owned Small Business (WOSB)	Santa Ana, California

## Primary U.S. Work Locations

California	Ohio
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## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

## Technology Areas

**Primary:**

- TX14 Thermal Management Systems
  - └ TX14.1 Cryogenic Systems
    - └ TX14.1.3 Thermal Conditioning for Sensors, Instruments, and High Efficiency Electric Motors